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Claims

- 5 1. Method of fastening an auxiliary joining element (2; 2') to a sheet-metal-like work-piece (3; 3a, 3b) in which the auxiliary joining element has a foot (6; 6') which is pressed from one side into the work-piece (3; 3a, 3b) held on a die (15) having a recess (19) and deforms this work-piece in pot-like manner, characterized in that the recess
- 10 (19) of the die has wall sections (20) which extend parallel to the pressing direction (14) and is interrupted by the die parts (levers 22; 22') which form undercuts (26) into which [the] material of the foot (6; 6') and of the work-piece (3; 3a, 3b) flows and forms undercut regions (29, 30) of the foot and of the work-piece which are restricted in the
- 15 peripheral direction.
- 16, 2nd  
2. Method in accordance with claim 1, characterized in that one allows the material to flow from regions without undercut into regions with undercut (29, 30).
- 20 3. Method in accordance with claim 1 or claim 2, characterized in that one produces wall sections at the outer side of the work-piece (3; 3a, 3b) opposite to the auxiliary joining element (2; 2') which extend parallel to the direction of pressing (14).
- 25 4. Method in accordance with one of the claims 1 to 3, characterized in that, when pressing via the work-piece (3; 3a, 3b), a closing force is produced on at least one tool part (22; 22') and on withdrawing the

<sup>LAB</sup>  
unit formed by the work-piece and the auxiliary joining element, an opening force is exerted on the tool part (22; 22') which is arranged in the region of an undercut (29, 30).

- 5    5. Method in accordance with one of the claims 1 to 4, characterized in that three or more undercut regions (29, 30) are produced.
6. Method in accordance with one of the claims 1 to 5, characterized in that one applies the pressure on the auxiliary joining element (2; 2') at an auxiliary shoulder (7; 7').
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7. Method in accordance with claim 6, characterized in that the auxiliary shoulder (7; 7') is arranged adjacent to the work-piece.
- 15    8. Method in accordance with one of the claims 1 to 7, characterized in that a further sheet-metal work-piece (3b) is arranged between the work-piece (3a) and the auxiliary joining element (2; 2') which is likewise deformed in pot-like <sup>LAB</sup> manner with undercuts restricted in the peripheral <sup>LAB</sup> direction.
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9. Apparatus for the fastening of an auxiliary joining element (2; 2') to a sheet-metal like work-piece (3; 3a, 3b) having a die (15) which has a recess (19), and a holder (9) for the auxiliary joining element (2; 2'), the holder being arranged in alignment with the recess (19) and being
- 25    movable in a pressing direction (14) relative to the die, characterized in that the peripheral <sup>LAB</sup> wall (20) of the recess (19) has movable wall sections (25) which are arranged on levers (22; 22') with the levers (22) being movable by pressure in the pressing direction (14) into a

working position and being fixable there and forming undercut regions (26) and being movable by a movement of <sup>the</sup> the unit comprising work-piece (3; 3a, 3b) and auxiliary joining element (2; 2') opposite to the pressing direction (14) into a release position in which the undercut regions (26) are fully released, and in that stationary wall sections (20) are provided between the movable wall sections (25).

10. Apparatus in accordance with claim 9, characterized in that the levers (22) have a substantially planar top side (33) which in <sup>a</sup> the working position stands perpendicular to the pressing direction (14) and lies in the same plane as the top side of the die (19).

11. Apparatus in accordance with claim 9 or claim 10, characterized in that each lever (22) is formed as a cranked lever (20).

12. Apparatus in accordance with claim 11, characterized in that the cranked lever has a short arm (23), on which the wall section (25) is provided and a long arm (24) at which a pivot axis or a pivot region is located.

13. Apparatus in accordance with one of the claims 9 to 11, characterized in that the lever has an outer side (27') which includes an acute angle with the pressing direction (14) and is guided on a correspondingly inclined counter surface (34), which extends outwardly opposite to the pressing direction (14).

14. Apparatus in accordance with one of the claims 9 to 13, characterized in that at least three levers (22; 22') are arranged distributed in the peripheral direction of the recess (19).
- 5 15. Apparatus in accordance with one of the claims 9 to 14, characterized in that stationary wall sections (20) are provided between the movable wall sections (25) and extends substantially parallel to the pressing direction (14).
- 10 16. Apparatus in accordance with one of the claims 9 to 15, characterized in that the die (15) has a security (27, 28) against drop-out for each lever (22; 22').
- 15 17. Apparatus in accordance with one of the claims 9 to 16, characterized in that the plunger (9) has a recess (10) into which a shaft (4, 4') of the auxiliary joining elements (2; 2') projects and is surrounded by a pressure surface (11), with the auxiliary joining element (2; 2') having an auxiliary shoulder (7; 7') which contacts the pressing surface (11).
- 20 18. Apparatus in accordance with one of the claims 9 to 17, characterized in that the die (15) has a projection (21) at the base of the recess, which presses the material of the work-piece (3; 3a, 3b) into an outwardly directed projection (8; 8') of the foot (6; 6') of the auxiliary joining element (2; 2') and ensures that the material of the foot forms the undercut regions (30).
- 25 19. Work-piece with an auxiliary joining element in which the work-piece (3; 3a, 3b) has an outwardly directed projection into which a foot (6;

6') of the auxiliary joining element (2; 2') projects, characterized in that the foot (6; 6') together with the work-piece (3; 3a, 3b) forms undercut regions (29, 30) which are restricted in the peripheral direction and wall sections which extend parallel to the pressing direction (14), i.e. parallel to the axial direction of the auxiliary joining element, are present on the outer side of the work-piece (3; 3a, 3b) opposite to the auxiliary joining element (2; 2') between the undercut regions (29, 30).